

Table A-1
Cost Estimate for Selected Remedy

Lockwood Solvent Groundwater Plume Site

CAPITAL COSTS					
Item	Unit	Unit Cost	Quantity	Cost	Source of Cost Data
Common Elements					
Connections to public water supply.	ea	\$ 7,000.00	3	\$ 21,000	Engineering Estimate
GAC/UV wellhead treatment	ea	\$ 5,000.00	3	\$ 15,000	Engineering Estimate
Extension of public water supply	ls	\$ 25,000.00	1	\$ 25,000	Engineering Estimate
Controlled Groundwater Area	ls	\$ 5,000.00	1	\$ 5,000	Engineering Estimate
Site Wide Treatment Barrier					
Injection Wells	ea	\$ 3,237.98	60	\$ 194,279	RACER
HRC-X (single application)	lb	\$ 5.35	15,750	\$ 84,263	Vendor Quote
Brenntag PRB Construction					
Temporary Sheet Piling	ls	\$ 546,510.26	1	\$ 546,510	RACER
Excavation, backfill and revegetation	ls	\$ 36,389.91	1	\$ 36,390	RACER
Zero-valent Iron	ls	\$ 720,110.83	1	\$ 720,111	RACER
Brenntag NW Area Soil Thermal Desorption					
Excavation	ls	\$ 183,070.00	0.63	\$ 115,194	RACER
Thermal Desorption	ls	\$ 459,273.00	0.63	\$ 288,991	RACER
Brenntag Tank Farm Vadose Soil SVE					
SVE Extraction Wells and Appurtenances	ls	\$ 77,223.00	0.27	\$ 21,061	RACER
Carbon Adsorption	ls	\$ 21,965.00	0.27	\$ 5,990	RACER
Electrical	ls	\$ 19,091.00	0.27	\$ 5,207	RACER
Brenntag Permanganate Treatment					
Injection Wells and Appurtenances	ls	\$ 72,440.00	1	\$ 72,440	RACER
Permanganate System	ls	\$ 34,506.00	1	\$ 34,506	RACER
Permanganate Treatment	ls	\$ 98,468.09	1	\$ 98,468	RACER
Brenntag Treatment Barrier					
Injection Wells	ea	\$ 3,237.98	100	\$ 323,798	RACER
HRC-X (single application)	lb	\$ 5.35	24,630	\$ 131,771	Vendor Quote
Beall Lactate Recirculation System					
Extraction Wells and Appurtenances	ls	\$ 46,416.00	1	\$ 46,416	RACER
Injection Wells and Appurtenances	ls	\$ 29,469.00	1	\$ 29,469	RACER
Electrical	ls	\$ 19,091.00	1	\$ 19,091	RACER
Beall Plume Leading Edge Treatment Barrier					
Injection Wells	ea	\$ 3,237.98	80	\$ 259,038	RACER
HRC-X (single application)	lb	\$ 5.35	21,000	\$ 112,350	Vendor Quote
Beall Vadose Soil SVE					
SVE Extraction Wells and Appurtenances	ls	\$ 383,235.00	1	\$ 383,235	RACER
Carbon Adsorption	ls	\$ 96,081.00	1	\$ 96,081	RACER
Electrical	ls	\$ 18,498.00	1	\$ 18,498	RACER
Other					
Non-hazardous soil and waste disposal	ls	\$ 39,669.00	1	\$ 39,669	RACER
Monitoring wells	ea	\$ 7,619.00	25	\$ 190,475	RACER
Decontamination Facilities	ls	\$ 24,759.00	1	\$ 24,759	RACER
SUBTOTAL				\$ 3,964,060	
Construction Contingencies	25%			\$ 991,015	10% Scope, 15% Bid
SUBTOTAL				\$ 4,955,075	
Project Management	5%			\$ 247,754	EPA Cost Guidance
Remedial Design	8%			\$ 396,406	EPA Cost Guidance
Construction Management	6%			\$ 297,305	EPA Cost Guidance
SUBTOTAL				\$ 941,464	
TOTAL CAPITAL COSTS				\$ 5,896,539	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (Year 1-5)						
Recirculation System O&M and Monitoring	ls	\$	30,792	1	\$	30,792 RACER
Lactate	lb	\$	0.65	42,000	\$	27,300 Vendor Quote
Brenntag SVE System O&M and Monitoring	ls	\$	83,683	0.27	\$	22,823 RACER
Beall SVE System O&M and Monitoring	ls	\$	160,344	1	\$	160,344 RACER
Groundwater monitoring (VOCs & MNA)	ea	\$	1,491	346	\$	515,886 RACER
Groundwater monitoring (VOCs)	ea	\$	1,011	44	\$	44,484 RACER
Surface water monitoring (VOCs)	ea	\$	1,024	24	\$	24,576 RACER
Wellhead treatment monitoring and maintenance	ea	\$	500	3	\$	1,500 Engineering Estimate
Annual information and education programs	ea	\$	5,000	1	\$	5,000 Engineering Estimate
				SUBTOTAL	\$	832,704
O&M Contingencies	25%			\$		208,176 10% Scope, 15% Bid
TOTAL YEARLY O&M COST				\$		1,040,880
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (Year 6-10)						
Recirculation System O&M and Monitoring	ls	\$	30,792	1	\$	30,792 RACER
Lactate	lb	\$	0.65	42,000	\$	27,300 Vendor Quote
Brenntag SVE System O&M and Monitoring	ls	\$	83,683	0.27	\$	22,823 RACER
Groundwater monitoring (VOCs & MNA)	ea	\$	1,491	173	\$	257,943 RACER
Groundwater monitoring (VOCs)	ea	\$	1,011	44	\$	44,484 RACER
Surface water monitoring (VOCs)	ea	\$	1,024	12	\$	12,288 RACER
Wellhead treatment monitoring and maintenance	ea	\$	500	3	\$	1,500 Engineering Estimate
Annual information and education programs	ls	\$	5,000	1	\$	5,000 Engineering Estimate
				SUBTOTAL	\$	402,129
O&M Contingencies	25%			\$		100,532 10% Scope, 15% Bid
TOTAL YEARLY O&M COST				\$		502,662
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (Year 11-20)						
Groundwater monitoring (VOCs & MNA)	ea	\$	1,491	106	\$	158,046 RACER
Surface water monitoring (VOCs)	ea	\$	1,024	12	\$	12,288 RACER
Wellhead treatment monitoring and maintenance	ea	\$	500	3	\$	1,500 Engineering Estimate
Annual information and education programs	ls	\$	5,000	1	\$	5,000 Engineering Estimate
				SUBTOTAL	\$	176,834
O&M Contingencies	25%			\$		44,209 10% Scope, 15% Bid
TOTAL YEARLY O&M COST				\$		221,043
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (Year 21-30)						
Groundwater monitoring (VOCs & MNA)	ea	\$	1,491	106	\$	158,046 RACER
Surface water monitoring (VOCs)	ea	\$	1,024	12	\$	12,288 RACER
Annual information and education programs	ls	\$	5,000	1	\$	5,000 Engineering Estimate
				SUBTOTAL	\$	175,334
O&M Contingencies	25%			\$		43,834 10% Scope, 15% Bid
TOTAL YEARLY O&M COST				\$		219,168
PERIODIC COSTS (with 25 percent contingency)						
PRB Iron Replacement (year 15)	ls	\$	1,303,011	1	\$	1,628,764 RACER
HRC-X (year 3)	ls	\$	5.35	61,380	\$	410,479 Vendor Quote
ORC (year 6)	ls	\$	10	61,380	\$	767,250 Vendor Quote
5-Year Review	ls	\$	33,609	1	\$	42,011 RACER

Notes

ls = lump sum

ea=each

GAC/UV = granular activated carbon/ultraviolet

MNA = monitored natural attenuation

VOC = volatile organic compounds

<p align="center">Table A-1 Cost Estimate for Selected Remedy Lockwood Solvent Groundwater Plume Site Present Value Analysis</p>						
Year	Capital Costs	O&M Costs	Periodic Costs	Total Annual Expenditures	Discount Factor (7%)	Present Value
0	\$ 5,896,539	0	0	\$ 5,896,539	1	\$ 5,896,539
1	0	\$ 1,040,880	0	\$ 1,040,880	0.9346	\$ 972,807
2	0	\$ 1,040,880	0	\$ 1,040,880	0.8734	\$ 909,105
3	0	\$ 1,040,880	\$ 410,479	\$ 1,451,359	0.8163	\$ 1,184,744
4	0	\$ 1,040,880	0	\$ 1,040,880	0.7629	\$ 794,088
5	0	\$ 1,040,880	\$ 42,011	\$ 1,082,892	0.713	\$ 772,102
6	0	\$ 502,662	\$ 767,250	\$ 1,269,912	0.6663	\$ 846,142
7	0	\$ 502,662	0	\$ 502,662	0.6227	\$ 313,008
8	0	\$ 502,662	0	\$ 502,662	0.582	\$ 292,549
9	0	\$ 502,662	0	\$ 502,662	0.5439	\$ 273,398
10	0	\$ 502,662	\$ 42,011	\$ 544,673	0.5083	\$ 276,857
11	0	\$ 221,043	0	\$ 221,043	0.4751	\$ 105,017
12	0	\$ 221,043	0	\$ 221,043	0.444	\$ 98,143
13	0	\$ 221,043	0	\$ 221,043	0.415	\$ 91,733
14	0	\$ 221,043	0	\$ 221,043	0.3878	\$ 85,720
15	0	\$ 221,043	\$ 1,670,775	\$ 1,891,818	0.3624	\$ 685,595
16	0	\$ 221,043	0	\$ 221,043	0.3387	\$ 74,867
17	0	\$ 221,043	0	\$ 221,043	0.3166	\$ 69,982
18	0	\$ 221,043	0	\$ 221,043	0.2959	\$ 65,406
19	0	\$ 221,043	0	\$ 221,043	0.2765	\$ 61,118
20	0	\$ 221,043	\$ 42,011	\$ 263,054	0.2584	\$ 67,973
21	0	\$ 219,168	0	\$ 219,168	0.2415	\$ 52,929
22	0	\$ 219,168	0	\$ 219,168	0.2257	\$ 49,466
23	0	\$ 219,168	0	\$ 219,168	0.2109	\$ 46,222
24	0	\$ 219,168	0	\$ 219,168	0.1971	\$ 43,198
25	0	\$ 219,168	\$ 42,011	\$ 261,179	0.1842	\$ 48,109
26	0	\$ 219,168	0	\$ 219,168	0.1722	\$ 37,741
27	0	\$ 219,168	0	\$ 219,168	0.1609	\$ 35,264
28	0	\$ 219,168	0	\$ 219,168	0.1504	\$ 32,963
29	0	\$ 219,168	0	\$ 219,168	0.1406	\$ 30,815
30	0	\$ 219,168	\$ 42,011	\$ 261,179	0.1314	\$ 34,319
TOTALS:	\$ 5,896,539	\$ 12,119,811	\$ 3,058,560	\$ 21,074,910		\$ 14,347,919
PV:	\$ 5,896,539	\$ 6,924,176	\$ 1,527,204	\$ 14,347,920		
TOTAL PRESENT VALUE						\$ 14,347,900

Notes:

- 1 Capital costs are assumed to occur in year zero.
- 2 Total annual expenditure is the total cost per year with no discounting.
- 3 Present value (PV) is the total cost per year including a 7% discount factor for that year.
- 4 Total present value is rounded to the nearest \$100.

Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Alternatives 1-8

ID: Lockwood Solvent Groundwater Plume Site

Location: BILLINGS, MONTANA

Modifiers: **Material** 1.0919 (Modified)

Labor 1.156 (Modified)

Equipment 0.9676 (Modified)

Category: None Label45

Report Option: Calendar Year

Description: Draft FS

Remedial Alternative

Name: Alternatives 1-8

ID: None

Type: None

Description:

Phase Element

Name: Five-Year Reviews

Media/Waste Type: Groundwater

Type: Remedial Action

Secondary Media/Waste Type: N/A

Labor Rate Group: System Labor Rate

Contaminant: Volatile Organic Compounds
(VOCs)

Analysis Rate Group: System Analysis Rate

Secondary Contaminant: None

Approach:

Markup Template: System Defaults

Technology

Name: Five-Year Review

Prime Markup: 100 %

Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	174.37	0.00	\$2,092.45	<input type="checkbox"/>
33220105	Project Engineer	15.00	HR	0.00	129.10	0.00	\$1,936.45	<input type="checkbox"/>
33220108	Project Scientist	11.00	HR	0.00	104.96	0.00	\$1,154.55	<input type="checkbox"/>
33220109	Staff Scientist	23.00	HR	0.00	100.19	0.00	\$2,304.28	<input type="checkbox"/>
Total Element Cost							\$7,487.72	

Element: Interviews

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220102	Project Manager	15.00	HR	0.00	174.37	0.00	\$2,615.56	<input type="checkbox"/>
Total Element Cost							\$2,615.56	

Element: Site Inspection

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	174.37	0.00	\$2,092.45	<input type="checkbox"/>
33220105	Project Engineer	23.00	HR	0.00	129.10	0.00	\$2,969.22	<input type="checkbox"/>
33220108	Project Scientist	19.00	HR	0.00	104.96	0.00	\$1,994.22	<input type="checkbox"/>
33220109	Staff Scientist	20.00	HR	0.00	100.19	0.00	\$2,003.72	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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							Total Element Cost	\$9,059.61
Element: Report								
Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	174.37	0.00	\$2,092.45	<input type="checkbox"/>
33220105	Project Engineer	31.00	HR	0.00	129.10	0.00	\$4,001.99	<input type="checkbox"/>
33220108	Project Scientist	25.00	HR	0.00	104.96	0.00	\$2,623.98	<input type="checkbox"/>
33220109	Staff Scientist	50.00	HR	0.00	100.19	0.00	\$5,009.30	<input type="checkbox"/>
							Total Element Cost	\$13,727.72
Element: Travel								
Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010108	Sedan, Automobile, Rental	3.00	DAY	69.52	0.00	0.00	\$208.57	<input type="checkbox"/>
33010202	Per Diem (per person)	6.00	DAY	85.00	0.00	0.00	\$510.00	<input checked="" type="checkbox"/>
33041101	Airfare	2.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
							Total Element Cost	\$718.57
							Total Technology Cost	\$33,609.19

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area

ID: Lockwood Solvent Groundwater Plume Site

Location: BILLINGS, MONTANA

Modifiers: **Material** 1.0919 (Modified)

Labor 1.156 (Modified)

Equipment 0.9676 (Modified)

Category: None Label45

Report Option: Calendar Year

Description: Draft FS

Remedial Alternative

Name: Alternative 6

ID: Alternative 6

Type: None

Description: Containment with PRB
Monitored Natural Attenuation
Institutional Controls

Phase Element

Name: Containment with PRB

Type: Remedial Action

Labor Rate Group: System Labor Rate

Analysis Rate Group: System Analysis Rate

Approach: In Situ

Description: ZVI Wall

Media/Waste Type: Groundwater

Secondary Media/Waste Type: N/A

Contaminant: Volatile Organic Compounds
(VOCs)

Secondary Contaminant: None

Markup Template: System Defaults

Technology

Name: Permeable Barriers

Prime Markup: 100 %

Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030415	Backfill with Excavated Material	360.30	CY	0.44	5.13	1.03	\$2,378.67	<input type="checkbox"/>
18050301	Topsoil, 6" Lifts, Off-Site	66.40	CY	24.67	8.66	3.79	\$2,464.36	<input type="checkbox"/>
18050402	Seeding, Vegetative Cover	0.08	ACRE	4,791.09	144.23	68.40	\$400.30	<input type="checkbox"/>
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	0.41	ACRE	5.37	54.69	39.35	\$40.76	<input type="checkbox"/>
33061011	Temporary Medium Wall Sheet Piling	19,728.00	SF	12.00	8.90	6.81	\$546,510.26	<input type="checkbox"/>
33061023	Normal Soil - 26' - 75' Slurry Wall Excavation	1,372.22	CY	0.00	3.69	4.43	\$11,142.71	<input type="checkbox"/>
33061027	Key-in Treatment Wall	128.07	CY	41.70	82.99	28.18	\$19,578.57	<input type="checkbox"/>
33061028	Level and Compact Working Surface	45.74	CY	0.00	3.70	5.29	\$411.21	<input type="checkbox"/>
33061031	Iron Filings	1,140.00	CY	542.52	49.43	37.52	\$717,592.96	<input type="checkbox"/>
Total Technology Cost							\$1,300,519.80	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Containment with PRB
Monitored Natural Attenuation
Institutional Controls

Phase Element

Name: Containment with PRB	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: ZVI Wall	

Technology

Name: Residual Waste Management
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33190103	Load Drums on Disposal Vehicle	18.00	EA	0.00	3.43	1.89	\$95.78	<input type="checkbox"/>
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	10.00	MI	2.22	0.00	0.00	\$22.21	<input type="checkbox"/>
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	840.00	MI	2.14	0.00	0.00	\$1,794.76	<input type="checkbox"/>
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	2.00	EA	611.46	0.00	0.00	\$1,222.92	<input type="checkbox"/>
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	18.00	EA	17.38	0.00	0.00	\$312.83	<input checked="" type="checkbox"/>
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	1,500.00	CY	12.87	0.00	0.00	\$19,310.29	<input checked="" type="checkbox"/>
Total Technology Cost							\$22,758.78	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 5
ID: Alternative 5
Type: None
Description: In place soil treatment using SVE

Phase Element

Name: Vadose Soil SVE	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Soil Vapor Extraction
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,563.09	2,781.11	\$4,344.20	<input type="checkbox"/>
33020303	Organic Vapor Analyzer Rental, per Day	4.00	DAY	158.87	0.00	0.00	\$635.48	<input type="checkbox"/>
33132360	500 SCFM, Vapor Recovery System	1.00	EA	27,046.85	0.00	0.00	\$27,046.85	<input type="checkbox"/>
33132377	Equipment Enclosure, 8' x 15', Portable Building/Shed; lined, insulated, skid mounted, w/exhaust fan	1.00	EA	3,445.96	0.00	0.00	\$3,445.96	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	4.00	DAY	150.21	0.00	0.00	\$600.86	<input type="checkbox"/>
33220112	Field Technician	64.00	HR	0.00	68.14	0.00	\$4,360.83	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	110.00	LF	1.58	5.21	9.27	\$1,766.78	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	110.00	LF	3.65	6.72	11.96	\$2,456.27	<input type="checkbox"/>
33230301	2" PVC, Well Plug	22.00	EA	7.69	7.82	13.91	\$647.02	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	242.00	LF	0.00	14.29	25.42	\$9,609.69	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	154.00	LF	4.10	4.43	7.88	\$2,527.30	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	44.00	LF	1.53	0.00	0.00	\$67.22	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	22.00	EA	12.19	17.58	31.29	\$1,343.43	<input type="checkbox"/>
33260428	2" PVC, Schedule 80, Connection Piping	577.50	LF	1.15	5.70	0.00	\$3,957.37	<input type="checkbox"/>
33260460	4" PVC, Schedule 80, Manifold Piping	385.00	LF	3.45	12.27	0.00	\$6,053.74	<input type="checkbox"/>
33270124	2" PVC, Schedule 80, Tee	22.00	EA	16.59	0.00	0.00	\$365.01	<input type="checkbox"/>
33270134	2" PVC, Schedule 80, 90 Degree, Elbow	22.00	EA	4.51	0.00	0.00	\$99.26	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33270136	4" PVC, Schedule, 90 Degree, Elbow	22.00	EA	18.65	0.00	0.00	\$410.33	<input type="checkbox"/>
33270167	4" x 2" Reducer, PVC Schedule 80	22.00	EA	48.61	0.00	0.00	\$1,069.52	<input type="checkbox"/>
33270440	2" PVC, Sch 80, Ball Valve	22.00	EA	115.99	0.00	0.00	\$2,551.82	<input type="checkbox"/>
33310209	Pressure Gauge	22.00	EA	92.65	82.96	0.00	\$3,863.57	<input type="checkbox"/>
Total Technology Cost							\$77,222.52	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
Material 1.0919 (Modified)
Labor 1.156 (Modified)
Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Vadose Soil SVE

Phase Element

Name: Vadose Soil SVE	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Soil Vapor Extraction
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 3:10:38 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,509.19	2,622.84	\$4,132.03	<input type="checkbox"/>
33020303	Organic Vapor Analyzer Rental, per Day	23.00	DAY	154.76	0.00	0.00	\$3,559.54	<input type="checkbox"/>
33132361	1000 SCFM, Vapor Recovery System	4.00	EA	33,896.75	0.00	0.00	\$135,587.00	<input type="checkbox"/>
33132377	Equipment Enclosure, 8' x 15', Portable Building/Shed; lined, insulated, skid mounted, w/exhaust fan	1.00	EA	3,356.84	0.00	0.00	\$3,356.84	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	23.00	DAY	146.33	0.00	0.00	\$3,365.57	<input type="checkbox"/>
33220112	Field Technician	368.00	HR	0.00	67.50	0.00	\$24,840.44	<input type="checkbox"/>
33230102	4" PVC, Schedule 40, Well Casing	1,365.00	LF	3.62	7.55	13.11	\$33,136.02	<input type="checkbox"/>
33230202	4" PVC, Schedule 40, Well Screen	390.00	LF	8.10	10.11	17.57	\$13,957.24	<input type="checkbox"/>
33230302	4" PVC, Well Plug	39.00	EA	31.38	11.07	19.23	\$2,405.73	<input type="checkbox"/>
33231103	Hollow Stem Auger, 11" Dia Borehole, Depth <= 100 ft	1,794.00	LF	0.00	21.56	37.46	\$105,873.93	<input type="checkbox"/>
33231402	4" Screen, Filter Pack	468.00	LF	7.05	7.55	13.11	\$12,969.48	<input type="checkbox"/>
33231812	4" Well, Portland Cement Grout	1,248.00	LF	2.23	0.00	0.00	\$2,786.19	<input type="checkbox"/>
33232102	4" Well, Bentonite Seal	39.00	EA	29.70	42.45	73.78	\$5,691.37	<input type="checkbox"/>
33260428	2" PVC, Schedule 80, Connection Piping	1,023.75	LF	1.12	5.50	0.00	\$6,783.63	<input type="checkbox"/>
33260460	4" PVC, Schedule 80, Manifold Piping	682.50	LF	3.36	11.85	0.00	\$10,381.88	<input type="checkbox"/>
33270124	2" PVC, Schedule 80, Tee	39.00	EA	16.16	0.00	0.00	\$630.33	<input type="checkbox"/>
33270134	2" PVC, Schedule 80, 90 Degree, Elbow	39.00	EA	4.40	0.00	0.00	\$171.42	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33270136	4" PVC, Schedule, 90 Degree, Elbow	39.00	EA	18.17	0.00	0.00	\$708.60	<input type="checkbox"/>
33270167	4" x 2" Reducer, PVC Schedule 80	39.00	EA	47.36	0.00	0.00	\$1,846.93	<input type="checkbox"/>
33270440	2" PVC, Sch 80, Ball Valve	39.00	EA	112.99	0.00	0.00	\$4,406.70	<input type="checkbox"/>
33310209	Pressure Gauge	39.00	EA	90.26	80.10	0.00	\$6,644.02	<input type="checkbox"/>
Total Technology Cost							\$383,234.88	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Vadose Soil SVE

Phase Element

Name: Vadose Soil SVE	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Overhead Electrical Distribution
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 3:11:03 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
20020301	1/0 ACSR Conductor	318.00	LF	0.29	1.06	0.07	\$450.82	<input type="checkbox"/>
20020310	1/C #2 Aluminum, Bare, Wire	176.00	LF	0.22	1.02	0.07	\$230.21	<input type="checkbox"/>
20020402	35' Class 3 Treated Power Pole	2.00	EA	399.54	541.87	52.75	\$1,988.32	<input type="checkbox"/>
20020430	Terminal Structure, 5 KV Pole Top	2.00	EA	1,670.66	2,038.15	198.42	\$7,814.45	<input type="checkbox"/>
20020511	5 KV, 3/0, Shielded Cable, Copper	105.00	LF	3.63	2.62	0.26	\$683.22	<input type="checkbox"/>
20020545	5 KV, 1/0 to 4/0 Conductor, Terminations & Splicing	6.00	EA	644.84	406.87	0.00	\$6,310.28	<input type="checkbox"/>
20039902	4" Rigid Steel Conduit	35.00	LF	12.78	16.40	0.00	\$1,021.09	<input type="checkbox"/>
Total Technology Cost							\$18,498.39	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Vadose Soil SVE

Phase Element

Name: Vadose Soil SVE	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Operations and Maintenance (12 months) **Templates:** System Air-VOCs
Prime Markup: 100 %
Sub Markup: 0 %
Comments: Operations and Maintenance

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Treatment Train Miscellaneous

Assembly	Description	Unit of Quantity asure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010423	Disposable Gloves (Latex)	305.00 PAIR	0.29	0.00	0.00	\$89.04	<input type="checkbox"/>
33010425	Disposable Coveralls (Tyvek)	305.00 EA	6.21	0.00	0.00	\$1,894.62	<input type="checkbox"/>
33190340	Non Haz Drummed Site Waste - Load, Transp. & Landfill Disp (55-Gal Drums)	8.00 EA	285.52	0.00	0.00	\$2,284.19	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	8.00 EA	103.26	0.00	0.00	\$826.10	<input type="checkbox"/>
99020110	Annual Maintenance Materials and Labor	1.00 LS	3,626.10	4,497.00	1,868.47	\$9,991.58	<input checked="" type="checkbox"/>
Total Element Cost						\$15,085.54	

Element: Soil Vapor Extraction

Assembly	Description	Unit of Quantity asure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021803	Tentative ID Compunds, GC/MS, Air (30/5041/8260B - TO-14), Air Analysis	48.00 EA	196.56	0.00	0.00	\$9,434.69	<input type="checkbox"/>
33220106	Staff Engineer	108.00 HR	0.00	99.13	0.00	\$10,705.73	<input type="checkbox"/>
33220112	Field Technician	538.00 HR	0.00	67.50	0.00	\$36,315.64	<input type="checkbox"/>
33420101	Electrical Charge	1,366,560.00 KWH	0.09	0.00	0.00	\$126,920.92	<input type="checkbox"/>
Total Element Cost						\$183,376.99	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Carbon Adsorption (Gas)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021803	Tentative ID Compunds, GC/MS, Air (30/5041/8260B - TO-14), Air Analysis	12.00	EA	196.56	0.00	0.00	\$2,358.67	<input type="checkbox"/>
33131942	Coal-based, 4 mm Pellet, for Solvent Recovery 2,000 - 10,000 Lb	7,805.00	LB	1.41	0.00	0.00	\$11,005.84	<input type="checkbox"/>
33132066	Removal, Transport, Regeneration of Spent Carbon, < 2K to 10 K lb	7,805.00	LB	0.39	0.00	0.00	\$3,059.44	<input type="checkbox"/>
33220106	Staff Engineer	96.00	HR	0.00	99.13	0.00	\$9,516.21	<input type="checkbox"/>
33220112	Field Technician	477.00	HR	0.00	67.50	0.00	\$32,198.07	<input type="checkbox"/>
33420101	Electrical Charge	136,656.00	KWH	0.09	0.00	0.00	\$12,692.09	<input type="checkbox"/>

Total Element Cost \$70,830.32

1st Year Technology Cost Subtotal	\$269,292.85
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Runtime Percent Cost Adjustment	97%
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1st Year Technology Cost	\$261,214.06
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Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Vadose Soil SVE

Phase Element

Name: Vadose Soil SVE	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Soil Vapor Extraction
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 3:09:33 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,509.19	2,622.84	\$4,132.03	<input type="checkbox"/>
33020303	Organic Vapor Analyzer Rental, per Day	23.00	DAY	154.76	0.00	0.00	\$3,559.54	<input type="checkbox"/>
33132361	1000 SCFM, Vapor Recovery System	4.00	EA	33,896.75	0.00	0.00	\$135,587.00	<input type="checkbox"/>
33132377	Equipment Enclosure, 8' x 15', Portable Building/Shed; lined, insulated, skid mounted, w/exhaust fan	1.00	EA	3,356.84	0.00	0.00	\$3,356.84	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	23.00	DAY	146.33	0.00	0.00	\$3,365.57	<input type="checkbox"/>
33220112	Field Technician	368.00	HR	0.00	67.50	0.00	\$24,840.44	<input type="checkbox"/>
33230102	4" PVC, Schedule 40, Well Casing	1,365.00	LF	3.62	7.55	13.11	\$33,136.02	<input type="checkbox"/>
33230202	4" PVC, Schedule 40, Well Screen	390.00	LF	8.10	10.11	17.57	\$13,957.24	<input type="checkbox"/>
33230302	4" PVC, Well Plug	39.00	EA	31.38	11.07	19.23	\$2,405.73	<input type="checkbox"/>
33231103	Hollow Stem Auger, 11" Dia Borehole, Depth <= 100 ft	1,794.00	LF	0.00	21.56	37.46	\$105,873.93	<input type="checkbox"/>
33231402	4" Screen, Filter Pack	468.00	LF	7.05	7.55	13.11	\$12,969.48	<input type="checkbox"/>
33231812	4" Well, Portland Cement Grout	1,248.00	LF	2.23	0.00	0.00	\$2,786.19	<input type="checkbox"/>
33232102	4" Well, Bentonite Seal	39.00	EA	29.70	42.45	73.78	\$5,691.37	<input type="checkbox"/>
33260428	2" PVC, Schedule 80, Connection Piping	1,023.75	LF	1.12	5.50	0.00	\$6,783.63	<input type="checkbox"/>
33260460	4" PVC, Schedule 80, Manifold Piping	682.50	LF	3.36	11.85	0.00	\$10,381.88	<input type="checkbox"/>
33270124	2" PVC, Schedule 80, Tee	39.00	EA	16.16	0.00	0.00	\$630.33	<input type="checkbox"/>
33270134	2" PVC, Schedule 80, 90 Degree, Elbow	39.00	EA	4.40	0.00	0.00	\$171.42	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33270136	4" PVC, Schedule, 90 Degree, Elbow	39.00	EA	18.17	0.00	0.00	\$708.60	<input type="checkbox"/>
33270167	4" x 2" Reducer, PVC Schedule 80	39.00	EA	47.36	0.00	0.00	\$1,846.93	<input type="checkbox"/>
33270440	2" PVC, Sch 80, Ball Valve	39.00	EA	112.99	0.00	0.00	\$4,406.70	<input type="checkbox"/>
33310209	Pressure Gauge	39.00	EA	90.26	80.10	0.00	\$6,644.02	<input type="checkbox"/>
Total Technology Cost							\$383,234.88	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Permeable Reactive Barrier

Phase Element

Name: Vadose Soil SVE(2)	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Operations and Maintenance (12 months) **Templates:** System Air-VOCs
Prime Markup: 100 %
Sub Markup: 0 %
Comments: Operations and Maintenance

Cost Database Date: 2003

Cost Type: System

Print Date: 1/18/2004 1:08:12 PM

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Technology Detail Report (with Markups)

Element: Treatment Train Miscellaneous

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010423	Disposable Gloves (Latex)	249.00	PAIR	0.29	0.00	0.00	\$72.69	<input type="checkbox"/>
33010425	Disposable Coveralls (Tyvek)	249.00	EA	6.21	0.00	0.00	\$1,546.76	<input type="checkbox"/>
33190340	Non Haz Drummed Site Waste - Load, Transp. & Landfill Disp (55-Gal Drums)	7.00	EA	285.52	0.00	0.00	\$1,998.67	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	7.00	EA	103.26	0.00	0.00	\$722.84	<input type="checkbox"/>
99020110	Annual Maintenance Materials and Labor	1.00	LS	979.17	1,214.34	504.55	\$2,698.06	<input checked="" type="checkbox"/>
Total Element Cost							\$7,039.02	

Element: Soil Vapor Extraction

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021803	Tentative ID Compunds, GC/MS, Air (30/5041/8260B - TO-14), Air Analysis	24.00	EA	196.56	0.00	0.00	\$4,717.35	<input type="checkbox"/>
33220106	Staff Engineer	93.00	HR	0.00	99.13	0.00	\$9,218.83	<input type="checkbox"/>
33220112	Field Technician	461.00	HR	0.00	67.50	0.00	\$31,118.05	<input type="checkbox"/>
33420101	Electrical Charge	700,800.00	KWH	0.09	0.00	0.00	\$65,087.65	<input type="checkbox"/>
Total Element Cost							\$110,141.88	

Cost Database Date: 2003

Cost Type: System

Print Date: 1/18/2004 1:08:12 PM

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Technology Detail Report (with Markups)

Element: Carbon Adsorption (Gas)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021803	Tentative ID Compunds, GC/MS, Air (30/5041/8260B - TO-14), Air Analysis	12.00	EA	196.56	0.00	0.00	\$2,358.67	<input type="checkbox"/>
33131942	Coal-based, 4 mm Pellet, for Solvent Recovery 2,000 - 10,000 Lb	4,003.00	LB	1.41	0.00	0.00	\$5,644.63	<input type="checkbox"/>
33132066	Removal, Transport, Regeneration of Spent Carbon, < 2K to 10 K lb	4,003.00	LB	0.39	0.00	0.00	\$1,569.11	<input type="checkbox"/>
33220106	Staff Engineer	74.00	HR	0.00	99.13	0.00	\$7,335.41	<input type="checkbox"/>
33220112	Field Technician	366.00	HR	0.00	67.50	0.00	\$24,705.44	<input type="checkbox"/>
33420101	Electrical Charge	70,080.00	KWH	0.09	0.00	0.00	\$6,508.77	<input type="checkbox"/>

Total Element Cost \$48,122.03

1st Year Technology Cost Subtotal \$165,302.93

Runtime Percent Cost Adjustment 97%

1st Year Technology Cost \$160,343.84

Cost Database Date: 2003

Cost Type: System

Print Date: 1/18/2004 1:08:12 PM

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: In situ oxidation of source area using permanganate

Phase Element

Name: In-situ Oxidation	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: Permanganate injection	

Technology

Name: Injection Wells
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 12:57:23 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
19010310	5,000 Gallon Water Tank, Steel, Horizontal @ Grade	1.00	EA	6,421.25	11,783.70	0.00	\$18,204.95	<input type="checkbox"/>
33020537	Water Level Chart Recorder for Monitoring Wells on Casings	6.00	EA	1,248.18	0.00	0.00	\$7,489.06	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	1.00	WK	316.01	0.00	0.00	\$316.01	<input type="checkbox"/>
33021511	Water Flowmeter	6.00	EA	108.22	0.00	0.00	\$649.34	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.58	5.21	9.27	\$963.70	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	210.00	LF	3.65	6.72	11.96	\$4,689.25	<input type="checkbox"/>
33230301	2" PVC, Well Plug	6.00	EA	7.69	7.82	13.91	\$176.46	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	270.00	LF	0.00	14.29	25.42	\$10,721.55	<input type="checkbox"/>
33231178	Move Rig/Equipment Around Site	5.00	EA	77.16	224.69	399.79	\$3,508.21	<input type="checkbox"/>
33231180	Mobilization/Demobilization, Drill Equipment or Trencher, Crew	1.00	EA	335.49	976.93	1,738.20	\$3,050.62	<input type="checkbox"/>
33231187	Load Supplies/Equipment	1.00	LS	201.30	586.16	1,042.92	\$1,830.37	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	228.00	LF	4.10	4.43	7.88	\$3,741.71	<input type="checkbox"/>
33231502	Surface Pad, Concrete, 4' x 4' x 4"	6.00	EA	83.08	253.41	8.16	\$2,067.92	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	42.00	LF	1.53	0.00	0.00	\$64.17	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	6.00	EA	12.19	17.58	31.29	\$366.39	<input type="checkbox"/>
33260428	2" PVC, Schedule 80, Connection Piping	600.00	LF	1.15	5.70	0.00	\$4,111.56	<input type="checkbox"/>
33270114	2" PVC, Schedule 40, 90 Degree, Elbow	6.00	EA	2.13	0.00	0.00	\$12.77	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33270402	2" Iron Body Check Valve	6.00	EA	219.59	65.55	0.00	\$1,710.88	<input type="checkbox"/>
33290102	10 GPM, 1/2 HP, Centrifugal Pump	6.00	EA	966.93	493.87	0.00	\$8,764.80	<input type="checkbox"/>
Total Technology Cost							\$72,439.71	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: In situ oxidation of source area using permanganate

Phase Element

Name: In-situ Oxidation	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: Permanganate injection	

Technology

Name: Operations and Maintenance (12 months)	Templates: System Water-VOCs
Prime Markup: 100 %	
Sub Markup: 0 %	
Comments: Operations and Maintenance	

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 12:50:11 PM

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Technology Detail Report (with Markups)

Element: Treatment Train Miscellaneous

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010423	Disposable Gloves (Latex)	110.00	PAIR	0.30	0.00	0.00	\$32.53	<input type="checkbox"/>
33010425	Disposable Coveralls (Tyvek)	110.00	EA	6.29	0.00	0.00	\$692.26	<input type="checkbox"/>
33190340	Non Haz Drummed Site Waste - Load, Transp. & Landfill Disp (55-Gal Drums)	3.00	EA	289.26	0.00	0.00	\$867.79	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	3.00	EA	104.62	0.00	0.00	\$313.85	<input type="checkbox"/>
99020110	Annual Maintenance Materials and Labor	1.00	LS	786.02	982.52	416.73	\$2,185.27	<input checked="" type="checkbox"/>
Total Element Cost							\$4,091.70	

Element: Advanced Oxidation Processes

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	12.00	EA	188.58	0.00	0.00	\$2,263.01	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	12.00	EA	149.83	0.00	0.00	\$1,798.02	<input type="checkbox"/>
33120851	7.5 KW Ultraviolet Source High Intensity Lamp	7.00	EA	252.52	0.00	0.00	\$1,767.62	<input type="checkbox"/>
33220106	Staff Engineer	42.00	HR	0.00	100.06	0.00	\$4,202.62	<input type="checkbox"/>
33220112	Field Technician	208.00	HR	0.00	68.14	0.00	\$14,172.70	<input type="checkbox"/>
33330171	Hydrogen Peroxide, 50% Solution, 500 Lb Drums	36.00	EA	1,284.25	0.00	0.00	\$46,233.03	<input type="checkbox"/>
33420101	Electrical Charge	102,817.00	KWH	0.09	0.00	0.00	\$9,674.35	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

							Total Element Cost	\$80,111.35
Element: Injection Wells								
Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	8.00	EA	188.58	0.00	0.00	\$1,508.67	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	8.00	EA	149.83	0.00	0.00	\$1,198.68	<input type="checkbox"/>
33220106	Staff Engineer	32.00	HR	0.00	100.06	0.00	\$3,201.99	<input type="checkbox"/>
33220112	Field Technician	156.00	HR	0.00	68.14	0.00	\$10,629.53	<input type="checkbox"/>
33420101	Electrical Charge	8,200.00	KWH	0.09	0.00	0.00	\$771.56	<input type="checkbox"/>
							Total Element Cost	\$17,310.44
							1st Year Technology Cost Subtotal	\$101,513.49
							Runtime Percent Cost Adjustment	97%
							1st Year Technology Cost	\$98,468.09

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: In situ oxidation of source area using permanganate

Phase Element

Name: In-situ Oxidation	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: Permanganate injection	

Technology

Name: Advanced Oxidation Processes
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
18020321	6" Structural Slab on Grade	1,000.00	SF	3.65	4.32	0.23	\$8,200.92	<input type="checkbox"/>
19040435	500 Gallon Nalgene Horizontal XLPE Tank with legs	1.00	EA	1,183.91	187.07	11.15	\$1,382.12	<input type="checkbox"/>
33120803	Peroxide System Mob/Assembly/Shakedown	1.00	EA	14,006.25	0.00	0.00	\$14,006.25	<input type="checkbox"/>
33120805	Operator Health and Safety Course	1.00	EA	589.21	2,380.45	0.00	\$2,969.66	<input type="checkbox"/>
33130116	0 - 50 GPM Cartridge Filter Equipment	1.00	EA	3,187.69	101.19	0.00	\$3,288.88	<input type="checkbox"/>
33260201	1" Stainless Steel Piping, Schedule 40, Threaded	100.00	LF	11.81	11.42	0.00	\$2,322.97	<input type="checkbox"/>
33290118	20 GPM, 1/2 HP, Transfer Pump with Motor, Valves, Piping	1.00	EA	1,367.86	967.20	0.00	\$2,335.06	<input type="checkbox"/>
Total Technology Cost							\$34,505.87	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative
Type: None
Description: Enhanced Bioremediation

Phase Element

Name: HRC-X Barrier	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: 80 well injection barrier	

Technology

Name: Groundwater Monitoring Well	Templates: Army Analytical Suites - Soil/Sed - 3 Suites
Prime Markup: 100 %	Army Analytical Suites - Soil/Sed - 3 Suites
Sub Markup: 0 %	

Cost Database Date: 2003

Cost Type: System

Print Date: 1/18/2004 4:20:22 PM

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Technology Detail Report (with Markups)

Element: Aquifer 1

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020303	Organic Vapor Analyzer Rental, per Day	23.00	DAY	156.82	0.00	0.00	\$3,606.79	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	23.00	DAY	148.27	0.00	0.00	\$3,410.25	<input type="checkbox"/>
33220112	Field Technician	368.00	HR	0.00	67.50	0.00	\$24,840.44	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	1,250.00	LF	1.56	5.10	8.89	\$19,445.73	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	500.00	LF	3.60	6.58	11.47	\$10,828.68	<input type="checkbox"/>
33230301	2" PVC, Well Plug	50.00	EA	7.59	7.65	13.34	\$1,429.18	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	1,800.00	LF	0.00	13.99	24.39	\$69,084.78	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	600.00	LF	4.05	4.34	7.56	\$9,567.61	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	1,100.00	LF	1.51	0.00	0.00	\$1,658.87	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	50.00	EA	12.03	17.22	30.02	\$2,963.58	<input type="checkbox"/>
Total Element Cost							\$146,835.91	

Element: General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,530.75	2,668.06	\$4,198.81	<input type="checkbox"/>
33231504	Surface Pad, Concrete, 2' x 2' x 4"	50.00	EA	52.72	159.53	5.03	\$10,864.44	<input type="checkbox"/>
Total Element Cost							\$15,063.25	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Total Technology Cost	\$161,899.16
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Cost Database Date: 2003
Cost Type: System
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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Enhanced Bioremediation

Phase Element

Name: Lactate Recirculation System	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Operations and Maintenance (12 months) **Templates:** System Water-VOCs
Prime Markup: 100 %
Sub Markup: 0 %
Comments: Operations and Maintenance

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Treatment Train Miscellaneous

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010423	Disposable Gloves (Latex)	90.00	PAIR	0.31	0.00	0.00	\$27.54	<input type="checkbox"/>
33010425	Disposable Coveralls (Tyvek)	90.00	EA	6.51	0.00	0.00	\$585.92	<input type="checkbox"/>
33190340	Non Haz Drummed Site Waste - Load, Transp. & Landfill Disp (55-Gal Drums)	3.00	EA	299.24	0.00	0.00	\$897.72	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	3.00	EA	108.22	0.00	0.00	\$324.67	<input type="checkbox"/>
99020110	Annual Maintenance Materials and Labor	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$1,835.85	

Element: In Situ Biodegradation (Saturated Zone)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	3.00	EA	195.09	0.00	0.00	\$585.26	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	3.00	EA	155.00	0.00	0.00	\$465.01	<input type="checkbox"/>
33220106	Staff Engineer	38.00	HR	0.00	102.87	0.00	\$3,908.98	<input type="checkbox"/>
33220112	Field Technician	188.00	HR	0.00	70.05	0.00	\$13,169.10	<input type="checkbox"/>
33420101	Electrical Charge	2,187.00	KWH	0.10	0.00	0.00	\$212.88	<input type="checkbox"/>
Total Element Cost							\$18,341.22	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Groundwater Extraction Wells

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	4.00	EA	195.09	0.00	0.00	\$780.35	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	4.00	EA	155.00	0.00	0.00	\$620.01	<input type="checkbox"/>
33220106	Staff Engineer	22.00	HR	0.00	102.87	0.00	\$2,263.09	<input type="checkbox"/>
33220112	Field Technician	110.00	HR	0.00	70.05	0.00	\$7,705.33	<input type="checkbox"/>
33420101	Electrical Charge	2,037.00	KWH	0.10	0.00	0.00	\$198.28	<input type="checkbox"/>
Total Element Cost							\$11,567.05	
1st Year Technology Cost Subtotal							\$31,744.12	
Runtime Percent Cost Adjustment							97%	
1st Year Technology Cost							\$30,791.80	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Enhanced Bioremediation

Phase Element

Name: Lactate Recirculation System	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: Groundwater Extraction Wells
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/15/2004 10:20:29 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17020203	Demolish Bituminous Pavement with Air Equipment	0.60	CY	0.00	56.68	9.82	\$39.90	<input type="checkbox"/>
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,563.09	2,781.11	\$4,344.20	<input type="checkbox"/>
33020303	Organic Vapor Analyzer Rental, per Day	7.00	DAY	158.87	0.00	0.00	\$1,112.10	<input type="checkbox"/>
33109660	5,000 Gallon Single-wall Steel Aboveground Tank	1.00	EA	6,060.51	2,400.10	243.24	\$8,703.85	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	6.00	DAY	150.21	0.00	0.00	\$901.28	<input type="checkbox"/>
33220112	Field Technician	20.00	HR	0.00	68.14	0.00	\$1,362.76	<input type="checkbox"/>
33230103	6" PVC, Schedule 40, Well Casing	60.00	LF	5.51	7.50	13.35	\$1,581.86	<input type="checkbox"/>
33230157	2" Pitless Adapter	3.00	EA	259.55	0.00	20.93	\$841.46	<input type="checkbox"/>
33230203	6" PVC, Schedule 40, Well Screen	42.00	LF	12.55	12.50	22.25	\$1,986.70	<input type="checkbox"/>
33230303	6" PVC, Well Plug	3.00	EA	84.50	19.54	34.76	\$416.40	<input type="checkbox"/>
33230521	4" Submersible Pump, 0.3-7 GPM, Head <=140', 1/3 hp, w/ controls	3.00	EA	2,607.08	0.00	0.00	\$7,821.23	<input type="checkbox"/>
33231103	Hollow Stem Auger, 11" Dia Borehole, Depth <= 100 ft	102.00	LF	0.00	22.32	39.72	\$6,328.69	<input type="checkbox"/>
33231172	Split Spoon Sample, 2" x 24", During Drilling	11.00	EA	57.40	0.00	0.00	\$631.35	<input type="checkbox"/>
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Development Water	19.00	EA	104.62	0.00	0.00	\$1,987.70	<input type="checkbox"/>
33231186	Well Development Equipment Rental (weekly)	3.00	WK	316.01	0.00	0.00	\$948.04	<input type="checkbox"/>
33231403	6" Screen, Filter Pack	42.00	LF	10.50	11.33	20.16	\$1,763.71	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33231813	6" Well, Portland Cement Grout	16.00	LF	12.99	0.00	0.00	\$207.78	<input type="checkbox"/>
33232103	6" Well, Bentonite Seal	3.00	EA	48.77	70.34	125.15	\$732.78	<input type="checkbox"/>
33232206	Restricted Area, Well Protection (with 4 Posts & Explosionproof Receptacle)	3.00	EA	748.17	586.69	2.26	\$4,011.39	<input type="checkbox"/>
33260425	1" PVC, Schedule 80, Connection Piping	150.00	LF	0.50	4.12	0.00	\$692.88	<input type="checkbox"/>
Total Technology Cost							\$46,416.06	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area B (Beall) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Enhanced Bioremediation

Phase Element

Name: Lactate Recirculation System	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults

Technology

Name: In Situ Biodegradation (Saturated Zone)
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

Print Date: 1/15/2004 10:19:25 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
19040627	10,000 Gallon Horizontal Plastic Sump with 6" NPT Connection	1.00	EA	7,611.71	1,885.79	191.12	\$9,688.62	<input type="checkbox"/>
33020537	Water Level Chart Recorder for Monitoring Wells on Casings	2.00	EA	1,248.18	0.00	0.00	\$2,496.35	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	1.00	WK	316.01	0.00	0.00	\$316.01	<input type="checkbox"/>
33021511	Water Flowmeter	2.00	EA	108.22	0.00	0.00	\$216.45	<input type="checkbox"/>
33021913	Laboratory Bench-scale Studies	3.00	EA	232.49	0.00	0.00	\$697.48	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	40.00	LF	1.58	5.21	9.27	\$642.47	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	30.00	LF	3.65	6.72	11.96	\$669.89	<input type="checkbox"/>
33230301	2" PVC, Well Plug	2.00	EA	7.69	7.82	13.91	\$58.82	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	70.00	LF	0.00	14.29	25.42	\$2,779.66	<input type="checkbox"/>
33231178	Move Rig/Equipment Around Site	1.00	EA	77.16	224.69	399.79	\$701.64	<input type="checkbox"/>
33231180	Mobilization/Demobilization, Drill Equipment or Trencher, Crew	1.00	EA	335.49	976.93	1,738.20	\$3,050.62	<input type="checkbox"/>
33231187	Load Supplies/Equipment	1.00	LS	201.30	586.16	1,042.92	\$1,830.37	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	36.00	LF	4.10	4.43	7.88	\$590.80	<input type="checkbox"/>
33231502	Surface Pad, Concrete, 4' x 4' x 4"	2.00	EA	83.08	253.41	8.16	\$689.31	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	34.00	LF	1.53	0.00	0.00	\$51.95	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	2.00	EA	12.19	17.58	31.29	\$122.13	<input type="checkbox"/>
33260428	2" PVC, Schedule 80, Connection Piping	200.00	LF	1.15	5.70	0.00	\$1,370.52	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

Print Date: 1/15/2004 10:19:25 PM

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33270114	2" PVC, Schedule 40, 90 Degree, Elbow	2.00	EA	2.13	0.00	0.00	\$4.26	<input type="checkbox"/>
33270402	2" Iron Body Check Valve	2.00	EA	219.59	65.55	0.00	\$570.29	<input type="checkbox"/>
33290102	10 GPM, 1/2 HP, Centrifugal Pump	2.00	EA	966.93	493.87	0.00	\$2,921.60	<input type="checkbox"/>
Total Technology Cost							\$29,469.24	

Cost Database Date: 2003

Cost Type: System

Print Date: 1/15/2004 10:19:25 PM

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Area A (Brenntag) Source Area
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
Material 1.0919 (Modified)
Labor 1.156 (Modified)
Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 6
ID: Alternative 6
Type: None
Description: Enhanced Bioremediation

Phase Element

Name: HRC-X Barrier	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description: 80 well injection barrier	

Technology

Name: Groundwater Monitoring Well	Templates: Army Analytical Suites - Soil/Sed - 3 Suites
Prime Markup: 100 %	Army Analytical Suites - Soil/Sed - 3 Suites
Sub Markup: 0 %	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Aquifer 1

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020303	Organic Vapor Analyzer Rental, per Day	23.00	DAY	156.82	0.00	0.00	\$3,606.79	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	23.00	DAY	148.27	0.00	0.00	\$3,410.25	<input type="checkbox"/>
33220112	Field Technician	368.00	HR	0.00	67.50	0.00	\$24,840.44	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	1,250.00	LF	1.56	5.10	8.89	\$19,445.73	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	500.00	LF	3.60	6.58	11.47	\$10,828.68	<input type="checkbox"/>
33230301	2" PVC, Well Plug	50.00	EA	7.59	7.65	13.34	\$1,429.18	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	1,800.00	LF	0.00	13.99	24.39	\$69,084.78	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	600.00	LF	4.05	4.34	7.56	\$9,567.61	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	1,100.00	LF	1.51	0.00	0.00	\$1,658.87	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	50.00	EA	12.03	17.22	30.02	\$2,963.58	<input type="checkbox"/>
Total Element Cost							\$146,835.91	

Element: General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,530.75	2,668.06	\$4,198.81	<input type="checkbox"/>
33231504	Surface Pad, Concrete, 2' x 2' x 4"	50.00	EA	52.72	159.53	5.03	\$10,864.44	<input type="checkbox"/>
Total Element Cost							\$15,063.25	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Total Technology Cost	\$161,899.16
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Cost Database Date: 2003
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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Decontamination Facilities
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternatives 3-8
ID: Alternative 6
Type: None
Description:

Phase Element

Name: Decontamination Facilities	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults

Technology

Name: Decontamination Facilities
Prime Markup: 100 %
Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,475.94	0.00	0.00	\$1,475.94	<input type="checkbox"/>
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	1.00	MO	3,303.30	0.00	0.00	\$3,303.30	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	40.00	HR	8.79	70.41	0.00	\$3,167.65	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	6.00	EA	101.91	0.00	0.00	\$611.46	<input type="checkbox"/>
33220112	Field Technician	240.00	HR	0.00	67.50	0.00	\$16,200.29	<input type="checkbox"/>
Total Technology Cost							\$24,758.64	

Cost Database Date: 2003

Cost Type: System

Print Date: 1/19/2004 3:48:09 PM

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Site Wide Monitoring Wells
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Alternative 3-8
ID:
Type: None
Description: Monitoring Well Construction

Phase Element

Name: Monitoring Well	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: In Situ	Markup Template: System Defaults
Description:	

Technology

Name: Groundwater Monitoring Well	Templates: Army Analytical Suites - Soil/Sed - 3 Suites
Prime Markup: 100 %	Army Analytical Suites - Soil/Sed - 3 Suites
Sub Markup: 0 %	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Aquifer 1

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	154.76	0.00	0.00	\$154.76	<input type="checkbox"/>
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	146.33	0.00	0.00	\$146.33	<input type="checkbox"/>
33220112	Field Technician	16.00	HR	0.00	67.50	0.00	\$1,080.02	<input type="checkbox"/>
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.54	4.96	8.59	\$301.82	<input type="checkbox"/>
33230201	2" PVC, Schedule 40, Well Screen	10.00	LF	3.56	6.40	11.08	\$210.36	<input type="checkbox"/>
33230301	2" PVC, Well Plug	1.00	EA	7.49	7.44	12.89	\$27.82	<input type="checkbox"/>
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	31.00	LF	0.00	13.60	23.56	\$1,151.95	<input type="checkbox"/>
33231401	2" Screen, Filter Pack	12.00	LF	4.00	4.22	7.30	\$186.17	<input type="checkbox"/>
33231811	2" Well, Portland Cement Grout	17.00	LF	1.49	0.00	0.00	\$25.30	<input type="checkbox"/>
33232101	2" Well, Bentonite Seal	1.00	EA	11.88	16.74	29.00	\$57.61	<input type="checkbox"/>
Total Element Cost							\$3,342.14	

Element: General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,487.63	2,577.62	\$4,065.24	<input type="checkbox"/>
33231504	Surface Pad, Concrete, 2' x 2' x 4"	1.00	EA	52.03	155.04	4.86	\$211.93	<input type="checkbox"/>
Total Element Cost							\$4,277.18	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Total Technology Cost	\$7,619.32
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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Site-Wide Monitoring
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Site Wide Monitoring
ID: Site Wide Monitoring
Type: None
Description: Site Wide Monitoring

Phase Element

Name: Groundwater Monitoring	Media/Waste Type: Groundwater
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Volatile Organic Compounds (VOCs)
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: None	Markup Template: System Defaults
Description: VOCs and MNA	

Technology

Name: Natural Attenuation (12 months only)
Prime Markup: 100 %
Sub Markup: 0 %

Templates: MNA Water - VOCS

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020401	Disposable Materials per Sample	110.00	EA	11.07	0.00	0.00	\$1,217.55	<input type="checkbox"/>
33020402	Decontamination Materials per Sample	110.00	EA	9.96	0.00	0.00	\$1,095.22	<input type="checkbox"/>
33020561	Nylon Tubing, 1/4" Outside Diameter	2,525.00	LF	0.58	0.00	0.00	\$1,457.54	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	2.00	WK	316.01	0.00	0.00	\$632.02	<input type="checkbox"/>
33021602	pH (EPA 150.1), Water Analysis	110.00	EA	15.15	0.00	0.00	\$1,666.63	<input type="checkbox"/>
33021603	Total Dissolved Solids (EPA 160.1), Water Analysis	110.00	EA	23.54	0.00	0.00	\$2,588.85	<input type="checkbox"/>
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.0/SM 4110B, Water Analysis	110.00	EA	64.15	0.00	0.00	\$7,056.40	<input type="checkbox"/>
33021618	Volatile Organic Analysis (EPA 624), Water Analysis	110.00	EA	397.82	0.00	0.00	\$43,760.60	<input type="checkbox"/>
33021653	Chloride (EPA 300), Water Analysis	110.00	EA	32.73	0.00	0.00	\$3,599.94	<input type="checkbox"/>
33021663	Dissolved Oxygen (EPA 360.1), Water Analysis	110.00	EA	50.27	0.00	0.00	\$5,529.75	<input type="checkbox"/>
33021667	Sulfate (EPA 300.0), Water Analysis	110.00	EA	33.33	0.00	0.00	\$3,666.61	<input type="checkbox"/>
33021668	Sulfide (EPA 376.1), Water Analysis	110.00	EA	56.56	0.00	0.00	\$6,222.13	<input type="checkbox"/>
33021673	Total Organic Carbon, TOC (EPA 415.1/415.2), Water Analysis	110.00	EA	47.47	0.00	0.00	\$5,222.14	<input type="checkbox"/>
33021678	Ferrous Iron (S.M. 3500 Fe - D)	110.00	EA	168.54	0.00	0.00	\$18,539.36	<input type="checkbox"/>
33021679	Dissolved Iron (II)	110.00	EA	53.30	0.00	0.00	\$5,862.97	<input type="checkbox"/>
33230510	4" Submersible Pump Rental, Week	2.00	WK	318.77	0.00	0.00	\$637.55	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33231186	Well Development Equipment Rental (weekly)	2.00	WK	316.01	0.00	0.00	\$632.02	<input type="checkbox"/>
Total Element Cost							\$109,387.27	

Element: General

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010104	Car or Van Mileage Charge	200.00	MI	0.50	0.00	0.00	\$99.19	<input type="checkbox"/>
33020577	pH/ORP/Temperature Meter - Daily Rental	10.00	DAY	60.19	0.00	0.00	\$601.93	<input type="checkbox"/>
33220108	Project Scientist	275.00	HR	0.00	102.10	0.00	\$28,076.55	<input type="checkbox"/>
33220112	Field Technician	160.00	HR	0.00	68.14	0.00	\$10,902.08	<input type="checkbox"/>
Total Element Cost							\$39,679.75	
1st Year Technology Cost							\$149,067.02	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Site-Wide Monitoring

ID: Lockwood Solvent Groundwater Plume Site

Location: BILLINGS, MONTANA

Modifiers: **Material** 1.0919 (Modified)

Labor 1.156 (Modified)

Equipment 0.9676 (Modified)

Category: None Label45

Report Option: Calendar Year

Description: Draft FS

Remedial Alternative

Name: Site Wide Monitoring

ID: Site Wide Monitoring

Type: None

Description: Site Wide Monitoring

Phase Element

Name: Groundwater Monitoring

Type: Long Term Monitoring

Labor Rate Group: System Labor Rate

Analysis Rate Group: System Analysis Rate

Approach: None

Description: VOCs only

Media/Waste Type: Groundwater

Secondary Media/Waste Type: N/A

Contaminant: Volatile Organic Compounds
(VOCs)

Secondary Contaminant: None

Markup Template: System Defaults

Technology

Name: Monitoring (12 months only)

Templates: System Water-VOCs

Prime Markup: 100 %

Sub Markup: 0 %

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report (with Markups)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020401	Disposable Materials per Sample	110.00	EA	11.07	0.00	0.00	\$1,217.55	<input type="checkbox"/>
33020402	Decontamination Materials per Sample	110.00	EA	9.96	0.00	0.00	\$1,095.22	<input type="checkbox"/>
33020561	Nylon Tubing, 1/4" Outside Diameter	2,525.00	LF	0.58	0.00	0.00	\$1,457.54	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	3.00	WK	316.01	0.00	0.00	\$948.04	<input type="checkbox"/>
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	110.00	EA	264.02	0.00	0.00	\$29,041.94	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	110.00	EA	209.77	0.00	0.00	\$23,074.59	<input type="checkbox"/>
33230510	4" Submersible Pump Rental, Week	3.00	WK	318.77	0.00	0.00	\$956.32	<input type="checkbox"/>
33231186	Well Development Equipment Rental (weekly)	3.00	WK	316.01	0.00	0.00	\$948.04	<input type="checkbox"/>
Total Element Cost							\$58,739.23	

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010104	Car or Van Mileage Charge	260.00	MI	0.50	0.00	0.00	\$128.95	<input type="checkbox"/>
33220108	Project Scientist	275.00	HR	0.00	102.10	0.00	\$28,076.55	<input type="checkbox"/>
33220112	Field Technician	208.00	HR	0.00	68.14	0.00	\$14,172.70	<input type="checkbox"/>
Total Element Cost							\$42,378.20	

Cost Database Date: 2003

Cost Type: System

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Technology Detail Report
(with Markups)

1st Year Technology Cost	\$101,117.43
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Cost Database Date: 2003
Cost Type: System
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Technology Detail Report (with Markups)

Folder: Lockwood Draft FS

Site

Name: Site-Wide Monitoring
ID: Lockwood Solvent Groundwater Plume Site
Location: BILLINGS, MONTANA
Modifiers:
 Material 1.0919 (Modified)
 Labor 1.156 (Modified)
 Equipment 0.9676 (Modified)
Category: None Label45
Report Option: Calendar Year
Description: Draft FS

Remedial Alternative

Name: Site Wide Monitoring
ID: Site Wide Monitoring
Type: None
Description: Site Wide Monitoring

Phase Element

Name: Surface Water Monitoring
Type: Long Term Monitoring
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: None
Description: VOCs only

Media/Waste Type: Groundwater
Secondary Media/Waste Type: N/A
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: None
Markup Template: System Defaults

Technology

Name: Monitoring (12 months only)
Prime Markup: 100 %
Sub Markup: 0 %

Templates: System Water-VOCs

Cost Database Date: 2003

Cost Type: System

Print Date: 5/18/2004 9:18:18 AM

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Technology Detail Report (with Markups)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020561	Nylon Tubing, 1/4" Outside Diameter	25.00	LF	0.62	0.00	0.00	\$15.55	<input type="checkbox"/>
Total Element Cost							\$15.55	

Element: Surface Water

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020520	Hip Waders	1.00	EA	154.93	0.00	0.00	\$154.93	<input type="checkbox"/>
33020524	Glass Coliwasas, Disposable, 7/8" x 42", 200 ml, Case of 12	2.00	EA	120.51	0.00	0.00	\$241.01	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	1.00	WK	340.53	0.00	0.00	\$340.53	<input type="checkbox"/>
33022131	Purgeable Halocarbons (SW 5030B/SW 8021B Halocarbons), Water Analysis	14.00	EA	284.50	0.00	0.00	\$3,983.02	<input type="checkbox"/>
33022132	Purgeable Aromatics (SW 5030B/SW 8021B Aromatics), Water Analysis	14.00	EA	226.04	0.00	0.00	\$3,164.62	<input type="checkbox"/>
Total Element Cost							\$7,884.12	

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010104	Car or Van Mileage Charge	20.00	MI	0.53	0.00	0.00	\$10.69	<input type="checkbox"/>
33220108	Project Scientist	35.00	HR	0.00	108.78	0.00	\$3,807.15	<input type="checkbox"/>

Cost Database Date: 2003

Cost Type: System

Print Date: 5/18/2004 9:18:18 AM

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Technology Detail Report (with Markups)

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220112	Field Technician	8.00	HR	0.00	72.60	0.00	\$580.77	<input type="checkbox"/>
Total Element Cost							\$4,398.60	
1st Year Technology Cost							\$12,298.28	

Cost Database Date: 2003

Cost Type: System

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